



ArcelorMittal

Commander Zeita Merchant  
Commanding Officer  
United States Coast Guard  
Marine Safety Unit Chicago  
555 Plainfield Road, Suite A  
Willowbrook, IL 60527

February 12, 2018

Subject: ArcelorMittal USA LLC - Indiana Harbor Ship Canal Oil Investigations  
ArcelorMittal West Outfalls 009 and 010-Technical Summary Report

Dear Commander Merchant:

Thank you for your letter of January 22, 2018 regarding the above ArcelorMittal investigations, and for the high level of cooperation, direction and professionalism by your staff as we worked through this issue over the past year.

Please find enclosed two copies of the final third-party report of the extensive investigations that were commissioned to address findings of oil on the Indiana Harbor Ship Canal near Indiana Harbor West Outfalls 009 and 010 in January 2017. The report also details corrective measures we took. As of the writing of the enclosed final report, repeated inspections of the Outfall 009/010 area show no signs of visible oil sheens.

Thank you again for the Coast Guard's cooperation in this matter.

Sincerely yours,

Thomas Barnett,  
Manager, Environmental Technology

cc: w/enclosure

Paul Higginbotham, Indiana Department of Environmental Management  
Timothy VanSumeren, ArcelorMittal USA LLC  
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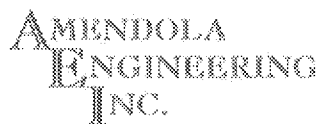
**ArcelorMittal USA LLC**  
**ArcelorMittal West**

**Indiana Harbor Ship Canal Oil Investigations**  
**Indiana Harbor Outfalls 009 and 010**

**Technical Summary Report**

**February 2018**

**Prepared by:**



**Amendola Engineering, Inc.**  
**Lakewood, OH**

**Prepared for:**



**ArcelorMittal**

**ArcelorMittal USA LLC**  
**East Chicago, IN**

**ArcelorMittal USA LLC**  
**ArcelorMittal West**

**Indiana Harbor Ship Canal Oil Investigations**  
**Indiana Harbor West Outfalls 009 and 010**

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**Technical Summary Report**

Background

On January 10, 2017, heavy accumulations of oil-like substances were observed behind oil booms stationed in the Indiana Harbor Ship Canal (IHSC) near Outfalls 009 and 010 at the ArcelorMittal USA LLC ("Indiana Harbor West" or "IH West") integrated steel mill located on the IHSC at East Chicago, Indiana. At the time, there had been canal disturbances due to heavy rains over the previous weekend, and there were 35 to 40 mph winds blowing from the south. The surface of the IHSC upstream of Outfalls 009 and 010 (Outfalls 009/010) was covered with heavy oil sheens and floating oil. This incident precipitated a series of investigations by the United States Coast Guard (USCG) and ArcelorMittal to determine the source or sources of visible oil observed behind the booms at Outfalls 009/010. This report presents the results of those investigations.

Attachment A is a chronology of events from January 10, 2017 to the present.

There are four potential sources of visible oil to the oil booms at Outfalls 009/010:

- IH West utility operations and non-contact cooling water systems that discharge to Outfalls 009/010;
- Oil sheens that have been observed on surface waters near the IH West No. 2 water intake (No. 2 Intake). The No. 2 Intake is the source of non-contact cooling water that is discharged to the IHSC through Outfalls 009/010;
- Historical releases of oil to the IHSC and Lake George Canal (LGC) upstream of IH West that have accumulated in IHSC and LGC sediments and earthen banks; and,
- Intermittent releases of oils to the IHSC and the LGC from active upstream oil terminals, oil storage facilities, oil pipelines and other possible upstream sources.

The first three of the above potential sources were studied in detail as part of this investigation. Because of the intermittent nature of current oil releases to surface waters of the IHSC and LGC, such releases could not be targeted effectively as part of these investigations.

The following field studies and investigations were conducted by the USCG and ArcelorMittal:<sup>1</sup>

- January/February USCG sampling of surface oil sheens near Outfalls 009/010, oil sheens and sediment in the ISHC upstream and near Outfalls 009/010 and the No. 2 Intake;
- Contemporaneous ArcelorMittal sampling of surface oil sheens and other media near and upstream of Outfalls 009/010 and a specific turbo blower lubricating oil used by ArcelorMittal;
- ArcelorMittal investigations of possible internal oil sources to Outfalls 009/010; and,
- A comprehensive study conducted by ArcelorMittal that included environmental forensics analyses of samples of Outfalls 009/010 area surface oil sheens; No. 2 Intake surface oil sheens and sediment; IHSC and LGC surface oil sheens and sediment; a sample of NAPL (non-aqueous phase liquid) from a monitoring well located near the No. 2 Intake and a sample of turbo blower lubricating oil.

In response to the January 10, 2017 incident and while the above investigations were being undertaken, ArcelorMittal continued to conduct routine visible oil surveillance and maintenance of the oil booms at Outfalls 009/010 and at the No. 2 Intake. That has been an ongoing best management practice (BMP) that was instituted several years ago and continues as of this writing.

As part of these investigations, ArcelorMittal identified and remediated discharges from sumps in the IH West turbo blower building basements that were intermittent sources of visible oil to Outfalls 009/010 (third bullet above). Since the sump discharges were rerouted and over the past several months daily observations at Outfalls 009/010 have shown little or no visible oil behind the containment booms. When present, the daily observations show only traces of visible oil at Outfalls 009/010. This is in contrast to the relatively heavy oil accumulations observed at Outfalls 009/010 and on the IHSC on January 10, 2017.

#### Summary of Results from USCG and ArcelorMittal Investigations

##### *USCG January/February 2017 Sampling Studies*

The USCG collected samples of oil and sheens on January 10, 2017 near Outfalls 009/010, on February 22, 2017 near the No. 2 Intake, and in February of ArcelorMittal turbo blower lubricating oil. Samples were analyzed by the USCG Marine Safety Lab (MSL) located at Groton, CT. The USCG study yielded inconclusive results. Specifically, the MSL was unable to determine the source of the two Outfall 009/010 area sheens, although the MSL implied that one of the No. 2 Intake oil sheens (CG 17-075-17) was possibly the source of the Outfall 009/010 oil (CG 17-058-2). The actual data and bases for this and the other conclusions were not included in the MSL report.<sup>2</sup>

##### *ArcelorMittal January/February Sampling Studies*

<sup>1</sup> ArcelorMittal also conducted related but separate investigations of oil sheens observed behind ArcelorMittal containment structures at Outfall 001 of the ArcelorMittal Indiana Harbor Central Wastewater Treatment Plant. The results of those investigations have been reported separately.

<sup>2</sup> Marine Safety Laboratory (2017) Case Number 17-075. Memorandum to MSU-Chicago, Activity No. 6073989. March 7, 2017.

In response to the January 10, 2017 finding of heavy accumulations of oil-like substances in the IHSC behind the containment booms at Outfalls 009/010, ArcelorMittal conducted a two-phase investigation that involved collection of the following samples related to Outfalls 009/010. The results of these investigations were reported previously to the USCG by ArcelorMittal.<sup>3,4</sup>

#### Phase 1

- Oil residue behind the containment booms at Outfalls 009/010 (Sample No. 17A0422-1c); collected on January 10, 2017.
- Split of IHSC sediment sample collected by U.S. EPA upstream of Outfalls 009/010 (Sample No. 17A0422-4); collected on January 13, 2017.
- Oil residue behind the containment booms at Outfalls 009/010 (Sample No. 17A0422-3); collected on January 20, 2017.

#### Phase 2

- Extract from IHSC Columbus Avenue absorbent pad (Sample No. 17A0422-05); collected on January 20, 2017.
- Extract from IHSC Columbus Avenue sediment (Sample No. 17A0422-06), collected on January 20, 2017.
- Extract from an Outfalls 009/010 containment sock (Sample No. 17A0422-10), collected on January 20, 2017.

At the time of the above sampling events ArcelorMittal observed heavy oil sheens upstream of Outfalls 009/010 on the IHSC and the LGC.

The samples were analyzed by Microbac – GCL (Boulder, CO) using Fourier Transform Infrared (FTIR). The results from the FTIR analyses of the Phase 1 samples show a high degree of match with consistent FTIR patterns across the three samples. The composition of the sediment sample collected upstream of Outfalls 009/010 led to a conclusion that the oil materials at Outfalls 009/010 were attributable to upstream historical contamination. The principal conclusion drawn from FTIR analyses of the Phase 2 samples was that the oil extracted from the Columbus Avenue absorbent pad and the oil extracted from the Columbus Avenue sediment matched the oil collected behind the containment booms at Outfalls 009/010.

#### *ArcelorMittal Internal Oil Source Investigation*

The No. 2 Intake supplies large volumes of non-contact cooling water to the IH West blast furnaces and ancillary power house and turbo blower operations. Approximately 100 million gallons per day (mgd) of non-contact cooling water and area storm water are discharged through Outfalls 009/010 on a once-through basis. There are no IH West process water discharges to the Outfalls 009/010 sewer system, except for a relatively low volume blowdown from the blast furnace process wastewater zinc treatment

<sup>3</sup> ArcelorMittal Memorandum. To: Keith Nagel. From: Cary Mathias. Subject: Interpretation of Sample Analysis from Initial Sheen Investigation at AM Indiana Harbor West. February 6, 2017. 7 pp.

<sup>4</sup> ArcelorMittal Memorandum. To: Keith Nagel. From: Cary Mathias. Subject: Interpretation of Sample Analysis from Phase 2 Sheen Investigation at AM Indiana Harbor West – Microbac Lab #17A0779. February 10, 2017. 8 pp.

plant (internal Outfall 509). By nature of the blast furnace process operations, internal Outfall 009 is known not to be a source of oil to Outfalls 009/010.

ArcelorMittal conducted a thorough review of possible sources of visible oil to Outfalls 009/010 and found two sources: the turbo blower basement sumps noted above, and visible oil that collects near the No. 2 Intake. This oil is associated with legacy releases of No. 6 fuel oil that occurred in the vicinity of the No. 2 Intake prior to the 1970s. This was addressed by U.S. EPA with a prior owner of the Indiana Harbor West facility.<sup>5</sup>

ArcelorMittal observations of Outfalls 009/010 following the January 10, 2017 incident revealed intermittent and short-term light oil sheens that typically lasted about 10 minutes. (ArcelorMittal reported the sheens to the NRC). These sheens were ultimately attributed to periodic low volume discharges from sumps located in the IH West turbo blower building basement. The sumps operate on automatic level control. When a sump level reaches a set point the sump pump turns on and then, at the time, emptied the sump into the Outfalls 009/010 sewer system. These sumps contain mostly water with some fugitive lubricating oil from the turbo blowers.

Upon discovery of the turbo blower sump contributions to visible oil at Outfalls 009/010, ArcelorMittal was able to quickly reroute three of the sump discharges to the IH West Terminal Lagoon and MSD Filter Plant, where the wastewaters are treated and discharged through Outfall 011. This was completed by January 27, 2017. At that time ArcelorMittal also initiated surveillance and vacuum truck service at the remaining sumps to prevent oil discharges to Outfalls 009/010. Once the three sumps were rerouted and the above surveillance and vacuum truck program was initiated the sump-related sheens at Outfalls 009/010 did not again occur.

ArcelorMittal completed an engineered pumping and piping project before the end of March 2017 to permanently reroute the remaining turbo blower sump discharges to the Terminal Lagoon. Thus, the sumps were not discharging to Outfalls 009/010 at the time of the August 2017 comprehensive study described below and in Attachment B. Furthermore, the August 2017 study results clearly show the turbo blower sumps were not a source of oil sampled by the USCG at Outfalls 009/010 in January 2017, or by ArcelorMittal in August 2017. The turbo blower lubricating oil is not similar to oils found elsewhere in this study.

#### *ArcelorMittal August 2017 Comprehensive IHSC and Outfalls 009/010 Sampling Studies*

Attachment B is a report of the field activities and implementation of ArcelorMittal's August 2017 comprehensive sampling studies in the Indiana Harbor Ship Canal, the Lake George Canal, Outfalls 009 and 010 and the No. 2 Intake.

Samples collected were analyzed by Alpha Analytical, Inc. (Mansfield, MA) and the analytical results were assessed by NewFields Companies, LLC (Rockland, MA). Alpha Analytical used modified EPA Methods 8015D and 8270D to perform the following analyses:

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<sup>5</sup> Docket No. CWA132I-6 06001. U.S. Environmental Protection Agency, Region V. ISG Indiana Harbor Inc., East Chicago, IN (Respondent). Administrative Order by Consent Under Section 311 of the Clean Water Act, 33 U.S.C. §1321. September 19, 2006.

*Total Petroleum Hydrocarbon Quantification and Fingerprinting*  
*PAH Quantification and Fingerprinting*  
*Quantitative Biomarker Fingerprinting*

Attachment C is a report prepared by NewFields that presents summaries of the sample analytical data generated by Alpha Analytical and the NewFields environmental forensics assessments of the data.

Figures 1 to 8 are aerial photographs that show approximate sampling locations as follows for the ArcelorMittal August 2017 comprehensive study:

Sample Locations	Sample Numbers	Sample Type
<u>Outfalls 009/010 area</u>		
IHSC upstream of 009/010 containment booms	AM 009/010-01	Surface oil sheen
Downstream of lift bridge	AM 009/010-04	Surface oil sheen
Upstream of lift bridge	AM 009/010-05	Surface oil sheen
IHSC near Outfalls 009/010		
Behind oil containment booms	AM 009/010-02	Surface oil sheen
Behind oil containment booms	AM 009/010-03	Surface oil sheen
<u>No. 2 Intake area</u>		
Intake channel	AM Intake 01	Surface oil sheen
Intake channel	AM Intake 02	Surface oil sheen
Intake channel	AM Intake 03	Surface oil sheen
Intake channel	AM Intake	Sediment
Monitoring well #2 (09/26/17)	AM MW-2	NAPL
<u>Lake George Canal</u>		
Upstream of Outfalls 009/010 (05/17/17)	1705009-07*	Sediment
Upstream of Outfalls 009/010	AM LGC1, G1&2	Sediment
Upstream of Outfalls 009/010	AM LGC1 Sheen	Surface Oil Sheen
<u>Indiana Harbor Ship Canal</u>		
Upstream of Outfalls 009/010 (05/17/17)	1705009-08*	Sediment
Upstream of Outfalls 009/010	AM IHSC1, G1&2	Sediment
Upstream of Outfalls 009/010	AM IHSC1 Sheen	Surface Oil Sheen
Upstream of Outfalls 009/010	AM IHSC2, G1&2	Sediment
Upstream of Outfalls 009/010	AM IHSC2 Sheen	Surface Oil Sheen
Upstream of Outfalls 009/010	AM IHSC3, G1&2	Sediment
Upstream of Outfalls 009/010	AM IHSC23 Sheen	Surface Oil Sheen
Upstream of Outfalls 009/010	AM IHSC4, G1&2	Sediment
Downstream of Outfalls 009/010	AM IHSC5, G1&2	Sediment
<u>Other</u>		
Turbo blower lubricating oil (08/10/17)	1708011-01*	Oil

*\*Alpha Analytical Sample ID (Field Sample ID not available)*

Exhibit 1 is a chart that summarizes results of the NewFields environmental forensics assessments for analyses of the above samples as well as for similar analyses of extracts from four oil sheen samples

collected by the USCG in January and February 2017. In summary, the analytical results and assessments show the following:

- The seven surface oil sheens collected in the IHSC at and near (upstream) of Outfalls 009/010 (two by the USCG in January/February and five by ArcelorMittal in August) were not derived from a single source; at least two “end member” sources were recognized.
- The January sample collected by the USCG in the IHSC near Outfalls 009/010 was derived from the same type of heavy fuel oil found in the sheens and sediment collected at the No. 2 intake. The August samples collected by ArcelorMittal behind the containment booms in the IHSC at Outfalls 009/010 are more closely related to the type of heavy fuel oil found near the No. 2 Intake, but also show influence from the upstream IHSC sediments.
- Although the same type of heavy fuel oil that is present at the No. 2 Intake was also present in some sheens collected near Outfall 009/010, differences in the degree of weathering suggest the mechanisms by which heavy fuel oil manifests itself at Outfalls 009/010 is unclear. This suggests the possibility of influence from heavy fuel oil releases from other sources upstream in the IHSC.
- The August IHSC sheen samples collected upstream of Outfalls 009/010 and immediately upstream and downstream of the lift bridge are more closely related to upstream IHSC sediments than the type of heavy fuel oil found at the No. 2 Intake. However, there is evidence of influence of heavy fuel oil in these samples, perhaps from upstream sources. It is unlikely the No. 2 Intake would influence samples collected upstream of Outfalls 009/010.
- Intermittent ArcelorMittal turbo blower lubricating oil releases to Outfalls 009/010 have been remediated. The turbo blower oil was not a source of Outfalls 009/010 oil sheens sampled in January and August 2017.

#### Current Status

ArcelorMittal has continued to conduct surveillance and remove visible oil as necessary at Outfalls 009/010 and at the No. 2 Intake. In addition, in October 2017 ArcelorMittal installed hard booms in a V-shaped pattern with skirts four feet deep at the No. 2 Intake. This is to further retard visible oil that may accumulate near the No. 2 Intake from reaching the intake structure.

Observations of the IHSC at Outfalls 009/010 behind the containment booms over the past several months show that visible oil is substantially absent. Only traces of visible oil have been observed from time to time in the southwest corner next to the lift bridge. This may be attributable to upstream sources.



The results of the investigations described above suggest that going forward possible sources of visible oil in the IHSC near Outfalls 009/010 may include the No. 2 Intake; IHSC and LGC oil releases from historically contaminated sediments; intermittent current oil releases from active upstream operations in the IHSC and LGC; or, combinations thereof. Notwithstanding, ArcelorMittal believes that it has in place effective measures to control oil sheen discharges to the Outfalls 009/010 area from the No. 2 Intake.